

NATO Task Group on Information Fusion

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INTRODUCTION

The Task Group on Information Fusion (TgonIF) is a task group affiliated to the NATO Research Technology Organisation (RTO) / Information Systems Technology (IST) Panel. The task group is addressing the importance and difficulty of fusing the always increasing variety and quantity of information produced by the full spectrum of sensors and sources during the ever changing type of military operations.

The first part of this report is a slightly updated version of the official status report made by the chairman of the task group, Gaetan Thibault from DRDC (Valcartier), Canada, and presented at the 9th IST Panel Business meeting taking place 30-31 May 2002 in Estoril Portugal.

The second part is a sample of examples taken from a course in Intelligence for OOTW given by WO1 Dave Steer, Defence Intelligence and Security Centre, Chicksands, UK. All names and references in these examples have been changed for security reasons.

OBJECTIVE

The Objective of the group is to identify, develop, improve and evaluate JDL Data Fusion level 2 (Situational Assessment) and level 3 (Threat Assessment) related information fusion capabilities within the context of an Multinational Intelligence Cell (MIC) in support of a Combined/Joint HQ deployed in operational level Peace Support Operations.

The focus of the task group stays strict to this objective meaning that the dissemination part of the intelligence cycle, including HCI, presentation and visualization issues, is not a part of study of the task group.

MEMBERSHIP

The members of task group is a mixture of developers, scientists and military advisors from the seven member nations: Canada, Denmark, France, Germany, the Netherlands, UK and USA.

The task group has held meetings hosted by the nations regularly twice a year starting October 1999.

ACHIEVEMENTS

The task group will complete its work by the end of 2003 and the results include:

- A Peace Support Operations scenario (Main Event List)

Paper presented at the RTO IST Workshop on "Massive Military Data Fusion and Visualisation: Users Talk with Developers", held in Halden, Norway, 10-13 September 2002, and published in RTO-MP-105.

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NATO Task Group on Information Fusion

- A Multinational Intelligence Cell (MIC) Conceptual Model levels 0, 1 and 2 (Rational Rose)
- A Multinational Intelligence Cell (MIC) Functional Model
- A subset of the MIC internal Functions and Sub-functions which are of most interest to intelligence staff
- A detailed list of prioritized Functions and Sub-functions
- Physical models of few selected Functions and Sub-functions
- Identification of emerging technologies to solve MIC problems
- A shared Web site for the Task Group members containing documentation of all achievements and relevant information.

THE INTELLIGENCE CYCLE

To transform information to intelligence a number of processes are taking place:

- Collation
- Evaluation
- Analysis
- Integration
- Interpretation

Of these processes, Analysis and Integration are identified to be of most interest for the follow on task group, Task Group on Information Fusion Demonstrator. Here functions from the prioritized list mentioned above will be implemented in order to demonstrate their usefulness for the Intelligence Analyst.

EXAMPLES

Information to be handled in OOTW are at the moment mainly of textural form either as structured reports or free text. When handled by the analyst in the collation process different visual tools are used like incident overlays, link analysis diagrams and pattern analysis plots. These are afterwards used in the analysis and integration process.

CONCLUSION

The work of the Task Group on Information Fusion is almost completed and the results will be carried over to the following Task Group on Information Fusion Demonstrator.

NATO Task Group on Information Fusion

(January 2000 to December 2002)



Status Report presented at Workshop on “Massive Military Data Fusion and Visualisation”, 10-13 September, Halden, Norway

Per Husmann Rasmussen, DDRE



NATO Task Group on Information Fusion

Objective

- **To identify, develop, improve and evaluate JDL Data Fusion level 2 (Situational Assessment) and level 3 (Threat Assessment) related information fusion capabilities within the context of an Multinational Intelligence Cell (MIC) in support of a Combined/Joint HQ deployed in operational level Peace Support Operations.**



NATO Task Group on Information Fusion

Participants

- Canada, Denmark, France, Germany, the Netherlands, UK, USA
- (a group of 18 persons including official members, military advisors and contractors)

Meetings

- Zeroth: 18 to 20 October 1999, DREV, Valcartier, Quebec, Canada
- First: 24 to 26 January 2000, DERA, Great Malvern, UK
- Second: 27 to 29 June 2000, RTA Facility, Paris, France
- Third: 22 to 26 January 2001, Hotel Delta Orlando Resort, FL, US
- Fourth: 18 to 22 June 2001, DDRE, Copenhagen, Denmark
- Fifth: 22 to 31 January 2002, Onera, Paris, France (+ Intelligence course)
- Sixth: 3 to 7 June 2002, TNO, Den Hague, Netherlands



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Progress to Date

- A Peace Support Operations scenario (Main Event List)
- A Multinational Intelligence Cell (MIC) Conceptual Model levels 0, 1 and 2 (Rational Rose) (final version Dec 2002)
- A subset of the MIC internal Functions and Sub-functions which are of most interest to intelligence staff
- A short course on Intelligence in Peace Support Operations
- A shared Web site for the Task Group members



NATO Task Group on Information Fusion

Future Work

- A Multinational Intelligence Cell (MIC) Functional Model
- A detailed list of prioritized Functions and Sub-functions
- Physical models of few selected Functions and Sub-functions
- Identification of emerging technologies to solve MIC problems
- Production of RTA documents (scenario and models)



NATO Task Group on Information Fusion

Documentation

(Web Site - <http://www.drev.dnd.ca/tgonif/>)

- Background Information (Aim, TAP, TOR, POW, Address List, History, Glossary of Terms, etc.)
- Detailed Minutes of each meeting
- Annual Reports
- Work accomplished so far (scenario, conceptual model)
- Other relevant information



NATO Task Group on Information Fusion

Liaison with other NATO Activities

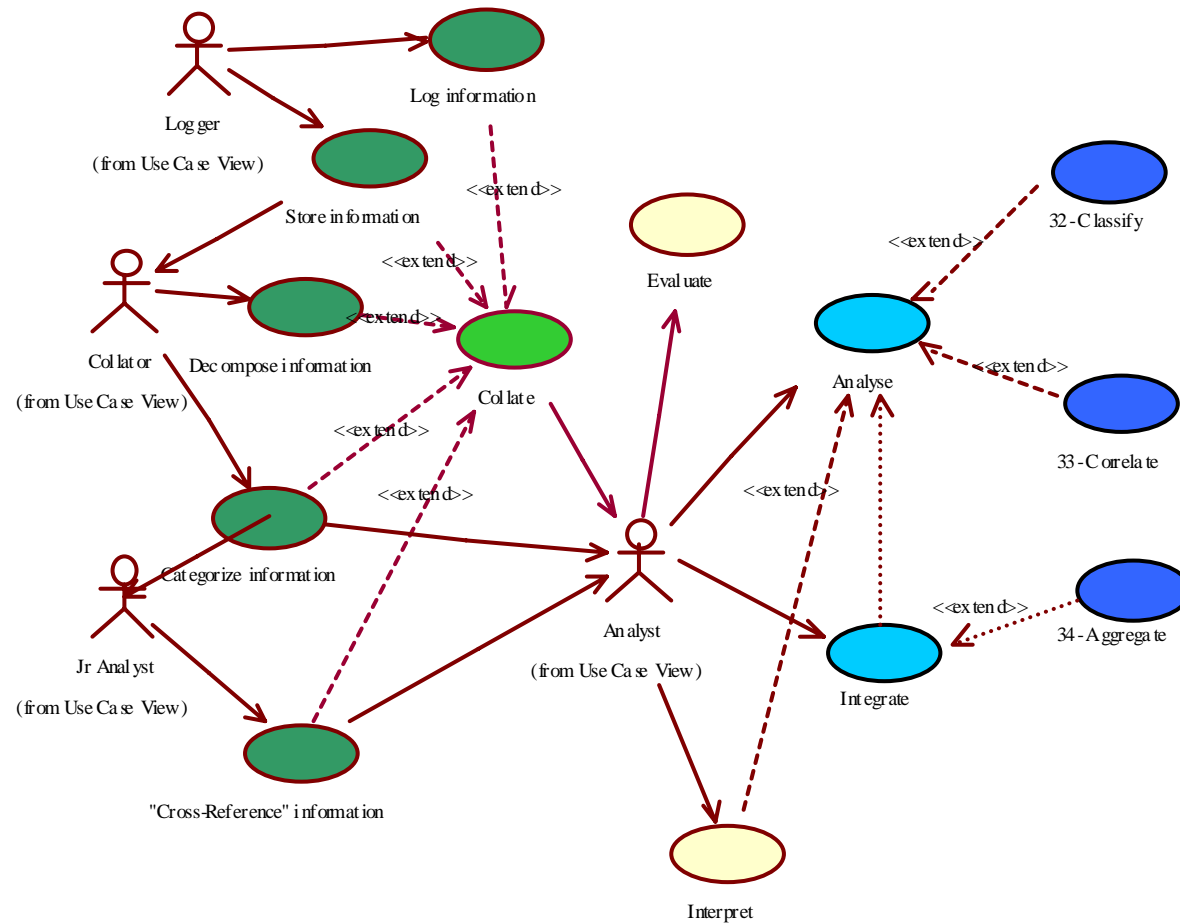
- Joint meeting with Task Group on Information Centric Sensor Management - SET TG-28 (24 January 2001)
- The NATO IST Symposium on Military Data and Information Fusion (scheduled for 20-22 October 2003, Prag)

Follow on to the NATO TGonIF

- A new Task Group on Information Fusion Demonstration (TGonIFD) starting in January 2003 will investigate and develop physical data fusion algorithms applicable in the context of a Multi-National Intelligence Cell (MIC).



Use Case view of MIC Functions





Example on “Information” I an incident

INCIDENT NUMBER: 10002

TYPE OF INCIDENT: SHOOTING

DATE/TIME OF INCIDENT: 07 MAY 96 AT 1410HRS

LOCATION OF INCIDENT: BARUKI SANGER GR: 7116 3508

FP CORNER NEVER ST/NORTH ST

TEXT

As 1 Royal Scots were handing over to 1 DERR on completion of their NIBAT tour. The respective OCs made it a no patrol day in Crisistown. Barouki Sanger was engaged by approx 8-10 rounds which struck the North West side of the sanger, with one striking the window. The FP was located at GR 7109 3518. Due to the threat of a come-on, no immediate follow-up was carried out. There were no SF casualties and fire was not returned. Upon the follow-up, carried out in the early hours of the following morning a vehicle, parked by the entrance of Shorts Lane on North Street, was found with entry points through the windscreen and bonnet, and exiting through the sunroof and rear boot area. There were no empty cases found at the scene



Example on “Information” II

Sightings of interest

- 5 May at 1400hrs, Crissy BARNEY was seen by the Enterprise Centre, GR 7101 3523. She was alone.
- 6 May at 142011rs, Allan KAUGNOT and Sean KAUGNOT were seen by CCTV sat by the entrance of Shorts Lane, GR 7108 3516.
- 6 May at 1700hrs, Crissy BARNEY and Anthony BYRRIS were seen talking outside Hanratty's Bar, 07 Never Street.6
- 7 May at 1130hrs, Sandra BOYLE was seen coming out of Yvonne's Salon, 06 The Square, GR 7121 3514. She was walking towards the telephone box.
- 7 May at 1355hrs, Crissy BARNEY was sighted by Barouki Sanger standing outside Murphy's Chemist, 16 The Square. She was observing the SF base, and then crossed The Square towards Mill Lane
- 7 May at 1500hrs, Joseph McCABLE was seen loitering outside McCONVILLE'S Bar. He seemed to be watching the SF activity around the Contact Point. With him was Anthony BYRRIS



Example on “Information” III

Source Information

- Henry MAVERICK was sighted with Eugene McMILLION, standing by the entrance, to McENTEE' S Butchers, 08 Never Street, just before the shooting. He seemed to signal to someone up the Barron Road.

HANDLER'S COMMENT:

- MAVERICK is assessed to be part of the support team, and his family has strong Republican sympathies. Eugene McMILLION is part of the Recce Team.



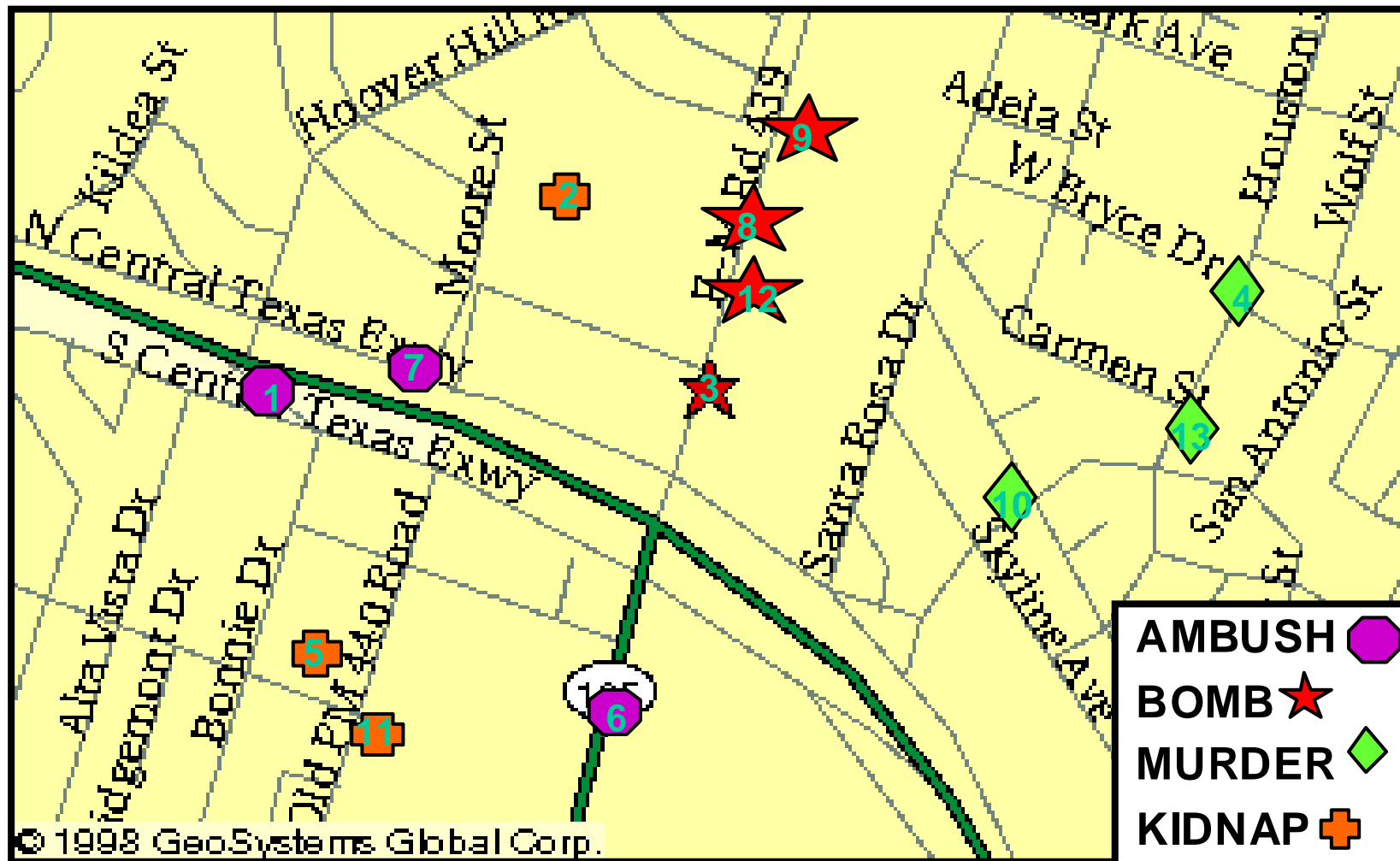
Visual Analytical Tools

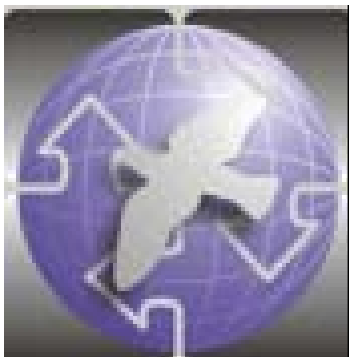
from “Intelligence Course”

- Incident overlay
- Link Analysis
- Calendar
- Pattern analysis plot
- Link Diagram



Incident overlay







Link Chart

PERSONALITIES	INCIDENTS	WEAPONS															IED (Puhix) .50 Rifle AKM
		Roy McCOY	Michelle BULLDOG	Palle SKOV	Danny CANVAS	James LONDON	Paddy BULLDOG	John FRYNS	Crissy BARNEY	Debby BRANDT	Brian BYRRIS	Jim McCBALD	Robert KOKS	ALLY MORRIS	Allan KACNOT	Mk 15 Mor	
	Mk 15 Mor 5 May	/					/	X		/	X		/		/		
	Shoot 7 May		X				/		/					/			
	Mk 15 Mor 14 Jul				/		/	X				/	/				
	Shoot 16 Jul	/	/						X					/			
Key																	
Performed																	
Involved																	
Mentioned																	

CALENDAR OF EVENTS

July

Mon 3 10 17 24 31
 Tues 4 11 18 25
 Wed 5 12 19 26
 Thurs 6 13 20 27
 Fri 7 14 21 28
 Sat 1  8 15 22 29
 Sun  2 9 16 23 30

August

Mon 7 14 21 28
 Tues 1 8 15 22 29
 Wed 2 9 16 23 30
 Thurs 3 10 17 24 31
 Fri 4 11 18 25
 Sat 5 12 19 26
 Sun 6 13 20 27

September

Mon 4 11 18 25
 Tues 5 12 19 26
 Wed 6 13 20 27
 Thurs 7 14 21 28
 Fri 1 8 15 22 29
 Sat 2  9 16 23 30
 Sun  3 10 17 24

KEY

Shoot: 

Mortar: 

October

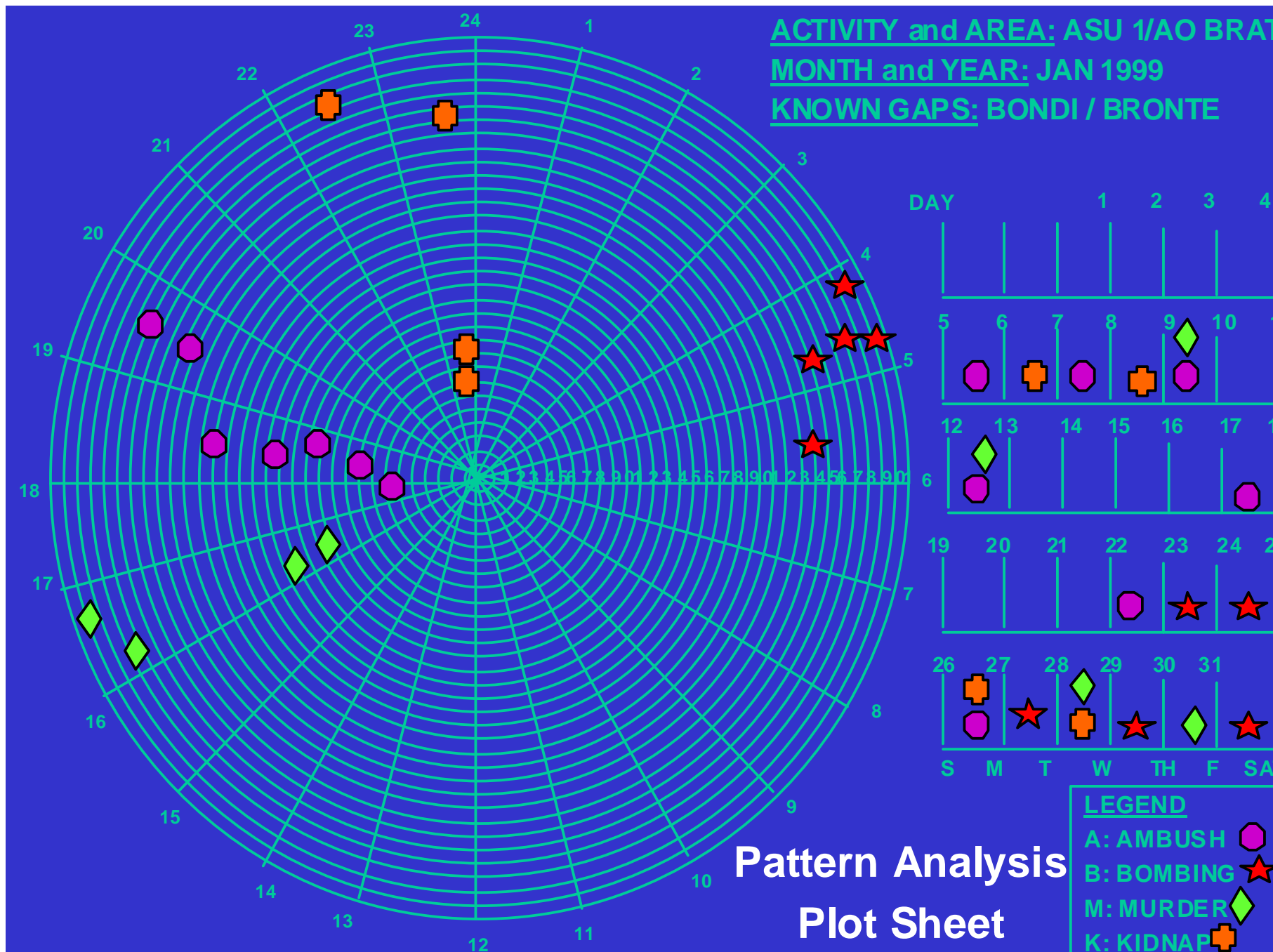
Mon 2 9 16 23 30
 Tues 3 10 17 24 31
 Wed 4 11 18 25
 Thurs 5 12 19 26
 Fri 6 13 20 27
 Sat 7 14 21 28
 Sun 1 8 15 22 29

November

Mon 6 13 20 27
 Tues 7 14 21 28
 Wed 1 8 15 22 29
 Thurs 2 9 16 23 30
 Fri 3 10 17 24
 Sat 4  11 18 25
 Sun  5 12 19 26

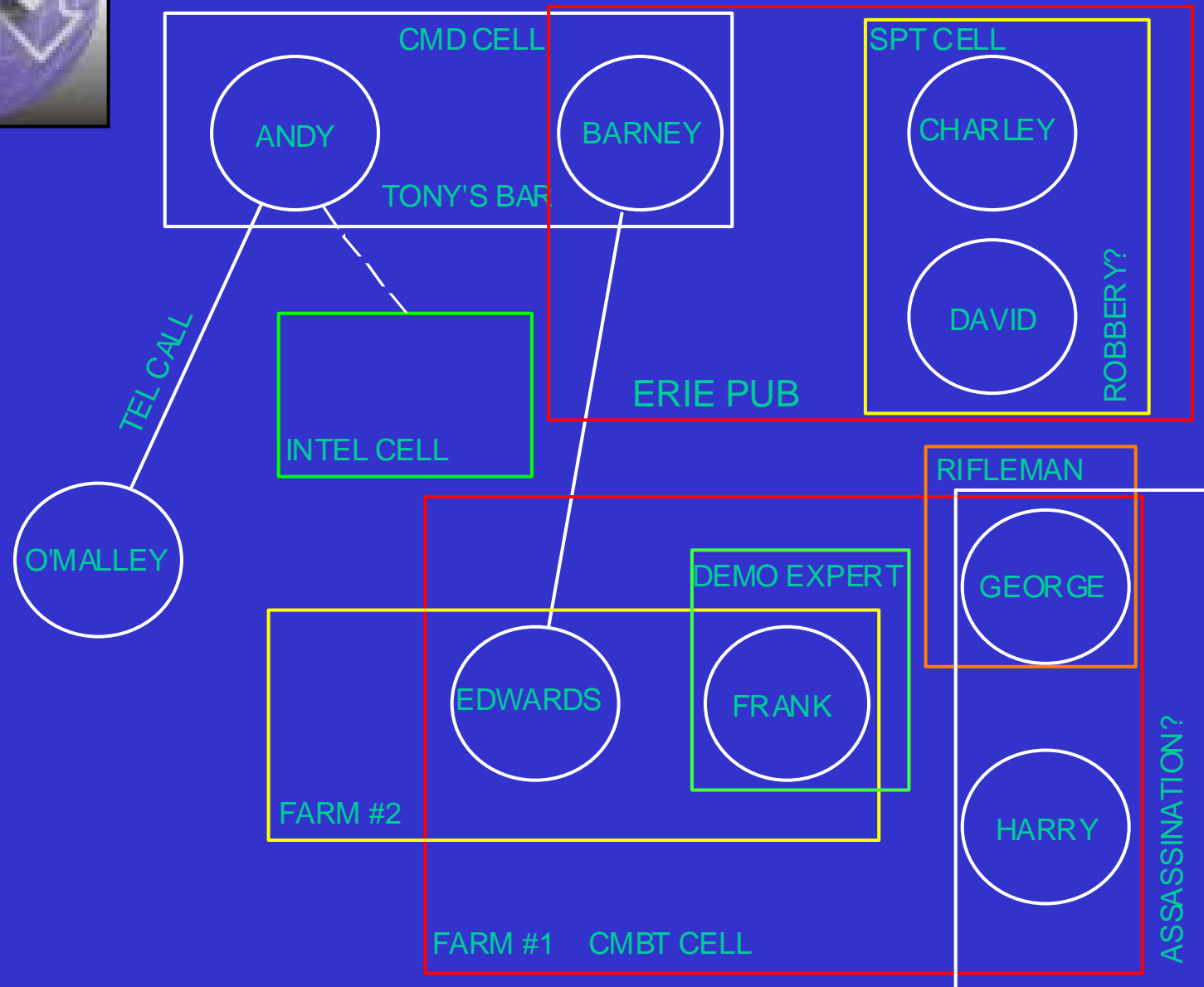
December

Mon 4 11 18 25
 Tues 5 12 19 26
 Wed 6 13 20 27
 Thurs 7 14 21 28
 Fri 1 8 15 22 29
 Sat 2 9 16 23 30
 Sun 3 10 17 24 31





LINK DIAGRAM



NATO Task Group on Information Fusion (January 2000 to December 2002)

